(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

**(19) World Intellectual Property Organization**
International Bureau

**(43) International Publication Date**
**27 January 2005 (27.01.2005)**

**PCT**

**(10) International Publication Number**
**WO 2005/008385 A2**

(51) **International Patent Classification⁷:** **G06F**

(21) **International Application Number:** PCT/US2004/021621

(22) **International Filing Date:** 7 July 2004 (07.07.2004)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**

| | | |
|---|---|---|
| 10/614,765 | 7 July 2003 (07.07.2003) | US |
| 60/537,421 | 16 January 2004 (16.01.2004) | US |

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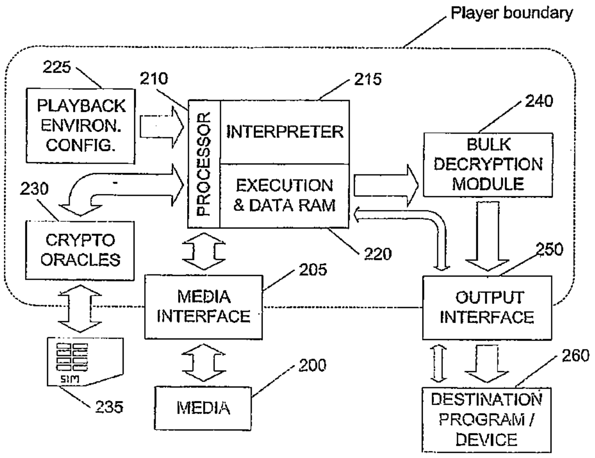
(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,

*[Continued on next page]*

(54) **Title:** REPROGRAMMABLE SECURITY FOR CONTROLLING PIRACY AND ENABLING INTERACTIVE CONTENT



(57) **Abstract:** Technologies are disclosed to transfer responsibility and control over security from player makers to content authors by enabling integration of security logic and content. An exemplary optical disc carries an encrypted digital video title combined with data processing operations that implement the title's security policies and decryption processes. Player devices include a processing environment (e.g., a real-time virtual machine), which plays content by interpreting its processing operations. Players also provide procedure calls to enable content code to load data from media, perform network communications, determine playback environment configurations, access secure nonvolatile storage, submit data to CODECs for output, and/or perform cryptographic operations. Content can insert forensic watermarks in decoded output for tracing pirate copies. If pirates compromise a player or title, future content can be mastered with security features that, for example, block the attack, revoke pirated media, or use native code to correct player vulnerabilities.

WO 2005/008385 A2